SOLUTIONS TO SELECTED PROBLEMS

**Student: You should work the problem completely before referring to the solution.**

# CHAPTER 5

Solutions included for problems 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, and 64

5.1 A service alternative is one that has only costs (no revenues).

5.4 (a) Total possible = $2^5 = 32$

(b) Because of restrictions, cannot have any combinations of 3,4, or 5. Only 12 are acceptable: DN, 1, 2, 3, 4, 5, 1&3, 1&4, 1&5, 2&3, 2&4, and 2&5.

5.7 Capitalized cost represents the present worth of service for an infinite time. Real world examples that might be analyzed using CC would be Yellowstone National Park, Golden Gate Bridge, Hoover Dam, etc.

5.10 Bottled water: Cost/mo = -(2)(0.40)(30) = $24.00
PW = -24.00(P/A,0.5%,12)
= $-278.85

Municipal water: Cost/mo = -5(30)(2.10)/1000 = $0.315
PW = -0.315(P/A,0.5%,12)
= $-3.66

5.13 $PW_{JX}$ = -205,000 – 29,000(P/A,10%,4) – 203,000(P/F,10%,2)
+ 2000(P/F,10%,4)
= $-463,320

$PW_{KZ}$ = -235,000 – 27,000(P/A,10%,4) + 20,000(P/F,10%,4)
= $-306,927

Select material KZ

5.16 i/year = $(1 + 0.03)^2 - 1 = 6.09\%$
$PW_A$ = -1,000,000 - 1,000,000(P/A,6.09%,5)
= -1,000,000 - 1,000,000(4.2021) (by equation)
= $-5,202,100

$PW_B = -600,000 – 600,000(P/A,3\%,11)$
$= \$-6,151,560$

$PW_C = -1,500,000 – 500,000(P/F,3\%,4) – 1,500,000(P/F,3\%,6)$
$- 500,000(P/F,3\%,10)$
$= \$-3,572,550$

Select plan C

5.19 $FW_{purchase} = -150,000(F/P,15\%,6) + 12,000(F/A,15\%,6) + 65,000$
$= \$-176,921$

$FW_{lease} = -30,000(F/A,15\%,6)(F/P,15\%,1)$
$= \$-302,003$

Purchase the clamshell

5.22 $CC = -400,000 – 400,000(A/F,6\%,2)/0.06$
$=\$-3,636,267$

5.25 $CC = -250,000,000 – 800,000/0.08 – [950,000(A/F,8\%,10)]/0.08$
$- 75,000(A/F,8\%,5)/0.08$
$= \$-251,979,538$

5.28 Find AW of each plan, then take difference, and divide by i.
$AW_A = -50,000(A/F,10\%,5)$
$= \$-8190$

$AW_B = -100,000(A/F,10\%,10)$
$= \$-6275$

CC of difference $= (8190 - 6275)/0.10$
$= \$19,150$

5.31 $CC = 100,000 + 100,000/0.08$
$= \$1,350,000$

5.34 No-return payback refers to the time required to recover an investment at i = 0%.

5.37 $0 = -22,000 + (3500 – 2000)(P/A,4\%,n)$
$(P/A,4\%,n) = 14.6667$

n is between 22 and 23 *quarters* or 5.75 years

5.40 $-250,000 - 500n + 250,000(1 + 0.02)^n = 100,000$

Try n = 18: 98,062 < 100,000
Try n = 19: 104,703 > 100,000

n is 18.3 months or 1.6 years.

5.43 LCC = $-2.6(P/F,6\%,1) - 2.0(P/F,6\%,2) - 7.5(P/F,6\%,3) - 10.0(P/F,6\%,4)$
$-6.3(P/F,6\%,5) - 1.36(P/A,6\%,15)(P/F,6\%,5) -3.0(P/F,6\%,10)$
$- 3.7(P/F,6\%,18)$
= $-36,000,921

5.46 I = 10,000(0.06)/4 = $150 every 3 months

5.49 Bond interest rate and market interest rate are the same.
Therefore, PW = face value = $50,000.

5.52 I = (V)(0.07)/2
201,000,000 = I(P/A,4%,60) + V(P/F,4%,60)

Try V = 226,000,000: 201,000,000 > 200,444,485
Try V = 227,000,000: 201,000,000 < 201,331,408

By interpolation, V = $226,626,340

5.55 PW = 50,000 + 10,000(P/A,10%,15) + [20,000/0.10](P/F,10%,15)
= $173,941
Answer is (c)

5.58 $PW_X$ = -66,000 –10,000(P/A,10%,6) + 10,000(P/F,10%,6)
= $-103,908
Answer is (c)

5.61 CC = -10,000(A/P,10%,5)/0.10
= $-26,380
Answer is (b)

5.64 Answer is (a)